#9

STATE OF MARYLAND

STATE PLANNING COMMISSION

CONSERVATION PROBLEMS

in

MARYLAND

Second Edition
1936

STATE OF MARYLAND

STATE PLANNING COMMISSION

Lavinia M. Engle, Vice-Chairman
W. L. Galvin
Robert H. Riley
H. D. Williar, Jr.
Abel Wolman, Chairman

Thomas F. Hubbard, Associate Consultant

CONSERVATION PROBLEMS

IN

MARYLAND

By

THE SUB-COMMITTEE ON CONSERVATION

Mrs. Alfonso Boley
W. S. Hamill
A. C. Jones
F. W. Lawson
William C. Todd
C. A. Lockerman
William Mortham
G. H. Pouder
Isaac H. Tawes
R. V. Truitt, Chairman

February, 1936.

PREFACE TO THE SECOND EDITION

This second edition of "Conservation Problems in Maryland" represents essentially a reprint of the original report, which was first published in the early part of 1935. With certain exceptions, the present revisions consist entirely of correcting the few minor errors that appeared in the first edition. In an effort to increase the general usefulness of the report, a table of contents and a topical index have also been added.

Abel Wolman, Chairman

State Planning Commission

Baltimore, Md.
February, 1936.

Preface to the First Edition

The State Planning Commission of Maryland presents herewith its second report on important problems of the State of Maryland, in accordance with the powers and duties delegated to it under an Act of the Special Session of the Legislative Assembly of Maryland of November, 1933.

The present document deals with one of the most important economic difficulties of the State. The Commission has had the highly cooperative effort of a sub-committee appointed by it on conservation problems. The report deals primarily with the problems of shellfish development and control.

"The daily papers often publish letters from oystermen who think that they can point out the true remedy, and the proposed remedies are almost as numerous as the authors, and nearly all the letters give statements which, while they are perfectly true, are based upon such narrow experience that they are of little or no value as contributions to a broad, comprehensive view of the problem.

"The tongmen know that most of the oysters have been taken away by the dredgers, and they therefore advocate the prohibition or restriction of dredging. Ignorant of the fact that in localities where no dredging has been allowed, the natural beds have been exhausted by tongmen just as soon as a demand for the oysters sprung up, they believe that the prohibition of dredging is all that is needed to restore the beds. The dredgers, on the other hand, attribute the injury to the law which allows the tongmen to take oysters for private use in the

summer, forgetting that the beds of Connecticut are rapidly increasing in value under a law which allows not only tonging, but dredging as well all through the year. The small dredgers and scrapers hold that the larger vessels are destroying the oysters by the use of heavy dredges, although the Connecticut farmers find it to their interest to use on their own private beds far heavier dredges, which they drag over the beds by steam.

"Many of the oyster-packers, who carry on their business only in the winter, believe that all the damage is due to the oystermen who fish in March, April and May, and men who have money invested in the oyster business in Maryland believe that the exportation of oysters in the shell, and especially oysters for planting in Northern waters, is the cause of the mischief.

"All agree in throwing the blame on some one else, and all believe that some form of the business in which they are not interested is responsible for the present state of things and should be prohibited; but as the oyster navy is a convenient scapegoat, all parties unite in throwing the blame upon the officers of the Fishery Force.-----

"I know of many destroyed oyster fisheries and I know of a few that have been rebuilt, and I find one cause common to all failures and as common to all successes. In the first instance, the fishery has been common property, its preservation everybody's business - that is, nobody's - and consequently it has not been preserved. In the second instance, the fishery has been conducted and owned by persons singly and together as private property; it has been this, that, or the

other man's business to see to its preservation; that is, its preservation has been everybody's business instead of nobody's and consequently it has been preserved."

The above quotations are from a volume on "The Oyster" issued by Dr. William K. Brooks of the Johns Hopkins University in 1890. In the forty-five years intervening since that time additional evidence of overwhelming character has been accumulated to confirm the validity and wisdom of his comments. The question may properly be raised now as to whether we shall go on another half a century without correcting the disabilities which Dr. Brooks and our present sub-committee so aptly set forth.

The State Planning Commission takes great pleasure in acknowledging here the high degree of cooperation which the sub-committee has afforded to it during a period of over twelve months. Its labors should bear fruit.

Abel Wolman

ABEL WOLMAN, Chairman
State Planning Commission.

Baltimore, Maryland.
February, 1935.

TABLE OF CONTENTS

GENERAL SUMMARY

The importance of the oyster in the fishing industry of the United States is shown by the fact that the value of the annual catch of oysters exceeds that of any other fish except salmon. Practically the entire production is obtained from the protected waters of the Atlantic and Gulf States, affording employment to thousands of workers and requiring the use of equipment valued at millions of dollars. The successful and profitable operation of such an important industry should command widespread interest.

Contrary to the general understanding, the oyster industry of the Atlantic and Gulf States during the past 25 years has been on a serious decline, the production from the 1910-1912 period to 1932 having decreased by 12,558,292 bushels, or 50.8 per cent. The major factors operating to bring about such a drastic curtailment of production are not of immediate origin, but have resulted from a continuance of the unsound conditions and short-sighted policies that have characterized and controlled the industry's operations over a long series of years. While the depression has not been without its adverse effects on the prosperity of the oyster business, it has served more properly to accelerate and intensify the trends already in existence.

The changing conditions in the oyster industry have also brought about a radical realignment in the relative importance of the several producing areas. Through an intelligent recognition of the fundamental factors governing the successful operation of the oyster fisheries, some States, through proper legislation, have endeavored to reestablish the industry on a practical and more stabilized basis, while in certain other states, such as Maryland, the industry's

development has been limited and controlled by short-sighted and unwise legislative policies.

The trends that have characterized the production of oysters in Maryland during recent decades render important a careful analysis of the factors that control and influence operations in this State; of the position that Maryland now occupies in the oyster industry of the country as a whole, and of the ability of Maryland to maintain a production of satisfactory proportions in the future. The adequacy of the measures that are now depended upon to conserve and improve the oyster resources of the State constitutes an index to Maryland's future position as an oyster-producing area. It is also of fundamental importance that a correct appraisal be given to the efficacy of these measures and to the opportunities available for the industry's further expansion and development.

A somewhat detailed summary is outlined below of certain of the more fundamental developments in the oyster industry, which should be taken into consideration in formulating any program designed to restore the industry in Maryland to its former position and importance. In order to facilitate the presentation of this introductory material, essential supporting data are appended in tabular form to the main body of the Committee's report.

Decline in the country's oyster consumption - According to the data presented in table 1, the aggregate oyster production in the Atlantic and Gulf States has shown a steady decline over a long period of years. The production of this group of States represents essentially the volume of oyster consumption in the United States, since practically no oysters are imported and the production along the Pacific Coast is comparatively small.

The apparent per capita consumption of oysters in the United States by decades, from 1880 to 1930, is shown in table 2. While

these data are naturally very general in character, they nevertheless indicate that the per capita consumption of oysters has shown a marked decrease during the period in question. It is significant to note that while the population of the United States, between 1880 and 1930, increased by 144.8 per cent, the per capita oyster consumption declined by 77.3 per cent during the same period.

This large contraction in the consumption of oysters indicates that something is vitally wrong with the industry's marketing mechanism, and further complicates the problem of restoring production to former levels. In any effort to increase the present supply of oysters, there should be a corresponding effort to increase the consumption and market distribution of this product.

Relative position of Maryland's oyster industry - It is apparent from the material presented in table 1, that the production of market-oysters in the Atlantic and Gulf States has decreased materially since 1880, although the decline in Maryland has been much more rapid. From 1884, the year of Maryland's peak production, to 1932, the decline in State's annual oyster catch, expressed in bushels, amounted to 81.6 per cent, while that for the group of States named decreased but 55.9 per cent between the periods of maximum and minimum production.

Maryland in 1880 was the most important oyster-producing State in the country, and its catch in that year comprised 47.5 per cent of the aggregate production for all the Atlantic and Gulf States. By 1930, however, Maryland's market oyster production represented only 15.4 per cent of the total for the group of States mentioned; in 1931, it amounted to 19.3 per cent, and in 1932 to 16.0 per cent. These figures indicate, therefore, that Maryland's oyster industry, in a period of approximately 40 years, has declined from a position of dominant rank to one of average importance.

Changing importance of the several oyster-producing States - The oyster production of the country has not only declined

greatly since 1880, but the relative importance of the several producing States has been subject to a somewhat radical realignment since that date.

From the information in table 3 it will be noted that the Chesapeake Bay Area in 1880 supplied 78.1 per cent of the volume of oysters taken from the waters of the Atlantic and Gulf States, and by 1930 it had declined to 34.8 per cent. Maryland's production decreased from 47.5 per cent in 1880 to 16.0 per cent in 1932, while that for Virginia declined from 30.6 per cent to 18.0 per cent for the same period.

During the time of rapidly diminishing oyster production in the Chesapeake Bay Area, certain States materially increased their production, while others, though showing a diminished supply, have managed to maintain their relative positions. From 1880 to 1932 the New England States' percentage of the oyster production for the Atlantic and Gulf States increased from 2.4 per cent to 9.2 per cent; the South Atlantic States increased from 1.7 per cent to 10.5 per cent, while that for the Gulf States advanced from 2.2 per cent to 30.6 per cent. The Middle Atlantic States practically maintained their relative importance, decreasing slightly from 15.7 per cent of the total in 1880 to 15.5 per cent in 1932. With the exception of Maryland, Virginia, New Jersey, and Delaware, all the Atlantic and Gulf States advanced their relative positions in the oyster industry during the period in question, while actual production increases were shown for all such States except Maryland, Virginia, New York, New Jersey, and Delaware.

It should be pointed out that while such important states as Virginia, New Jersey, and New York showed a production decline since 1880, their present operations are being conducted on a more practical basis than are those in Maryland. As will be explained later, this situation is due primarily to the fact that these States permit private-planting operations on a large scale, whereas the policy in Maryland has been to rely almost exclusively on the production from public grounds.

Trend in Maryland's oyster production - According to the data shown in table 4 Maryland's oyster production has been more or less downward since 1890, and in 1933 the volume of the commercial catch amounted to only 1,778,506 bushels, the smallest for any of the individual years shown. From 1880, the year of peak production, to 1933, the volume of the State's oyster catch, expressed in bushels, declined by 83.2 per cent. The value of the production has also shown a corresponding downward trend amounting, in 1933, to only $788,197, the least of any of the years shown.

This great decline in production is probably even more serious than the Government figures would seem to indicate. This assumption is based largely on the fact that competent students, such as Dr. W. K. Brooks, of the Johns Hopkins University, had placed the peak annual production at approximately 15,000,000 bushels, whereas the largest catch shown in table 4 for any individual year is 10,600,000 bushels.

Fundamental reasons for the decline in Maryland's oyster industry - Over fishing, the wholesale exportation of seed oysters to other States, together with a failure to return shells to the oyster beds, have been primarily responsible for the large decrease in the oyster output of the State, which is taken almost entirely from public grounds. Inasmuch as oyster shells form the best possible type of cultch for catching the young oyster spat, the removal of millions of bushels of shells over a long period of years has greatly diminished the opportunity for young oysters to develop. The failure on the part of the State to inaugurate early a comprehensive program of public rehabilitation, or to permit the development of private-planting operations on a large enough scale, accounts for the fact that the declining oyster production in Maryland was not checked until the low levels of recent years had been reached.

Adverse effects of Maryland's declining oyster production - The economic consequences of Maryland's dwindling oyster production are more fully appreciated when it is pointed out that the purchasing power of the

population dependent upon this industry has been seriously reduced. This situation has reacted unfavorably on general business conditions throughout the State, creating in some sections emergency problems of unemployment and relief, which are apparently beyond local solution. In addition to these unfavorable conditions, the short-sighted policy of taking oysters before they are fully grown has operated to reduce the quality of oysters produced in this State. Furthermore, the decline in the supply has so increased the cost of fishing operations that the small oysters, which formerly went into canning, are now marketed in the fresh state. This condition, among other factors, has practically destroyed Maryland oyster-canning industry, which ten or twelve years ago produced a pack valued at over $750,000 annually. The seriousness of Maryland's contracting oyster production is more fully described under the following headings:

1) - Loss in employment - The serious decline in Maryland's oyster production, as reflected in decreased opportunities for employment, is strikingly shown in Table 5. According to the data shown in Table 5, the number of tonging licenses issued by the State from 1916 to 1933 decreased by 3,136, or 43.0 per cent; the number of scraper licenses was fewer by 617, or 84.5 per cent; and the number of dredging licenses was less by 384, or 86.1 per cent. From these figures it is conservatively estimated that at least 5,000 fewer people were directly employed in taking oysters in 1933 than in 1916. This estimate, however, does not include numerous other persons who have lost employment through the contraction of other branches of the industry, such as shucking, canning, et cetera.

2) Large-size oysters no longer taken in quantities from Maryland waters - The dwindling supply of Maryland oysters has forced the fishermen to work intensively the few remaining bars that are now producing. This condition has resulted in the practice of taking the oysters before they reach full maturity, and which, because of their size, must be sold as "standards".

3) Maryland now dependent on other States for large-size oysters - In order to supply the demands of the trade, Maryland packers have

been forced to import large-size oysters from other producing States such as Virginia, New Jersey and New York. It should also be mentioned that the failure of Maryland to produce oysters of proper size has lost to other States most of the profitable raw-bar trade that it once possessed.

4) Decline in oyster canning - Maryland at one time was the center of the oyster-canning industry, but the decreased supply of recent years, accompanied by higher fishing costs, has forced this industry practically to abandon operations, especially in face of competition with the cheap southern product. Table 6 shows that Maryland in 1921 produced a pack of canned oysters valued at $778,435, or 35.7 per cent of the value of the country's total output. Since that time the production has declined, and in 1931 the industry in Maryland had ceased to operate.

Efforts of the State to rehabilitate the oyster industry - Aside from the enactment and administration of laws regulating the size, season of capture, type of equipment to be employed, et cetera, the State for many years did relatively little towards stemming the rapid depletion of its public oyster bars. It was not until 1927 that the Legislature made provision for a shell-planting program of any effective magnitude. These activities were to be financed through the passage of a 10 per cent shell tax on the packing houses, the use of the revenue from the gasoline tax on work boats, and by direct appropriations.

Since the inauguration of this new policy in 1927 to 1934 a total of 6,110,942 bushels of shells had been distributed on the natural bars of the State, making an average annual planting of approximately 764,000 bushels per year. During this same period a total of 372,853 bushels of seed oysters were taken from the head of the Bay and planted on the natural bars, or an average of about 47,000 bushels per year. The greater portion of both shell and seed plantings were made in the tributary waters, the small portion being distributed on selected areas in the Chesapeake Bay.

In regard to stimulating private oyster culture, the Legislature as early as 1906 enacted laws permitting the leasing of certain submerged bottoms to private interests for the propagation and growth of oysters. These and subsequent laws have been so restrictive in character that private culture in Maryland has never attained any substantial development.

Failure of the efforts of the State to check downward trend in oyster production - While the efforts on the part of the State to stem the depletion of the public oyster bars have met with some degree of success, its activities have never been conducted on a large enough scale to bring back into productivity even a fair portion of the extensive potentially productive bottoms. Even though its efforts had attained the highest possible degree of success, vast areas of suitable grounds would still remain unproductive.

When it is pointed out that 1,000 bushels of shells are required on the average to plant one acre of bottom, and that the charted natural oyster bars of Maryland comprise an area of about 265,000 acres, it is apparent that at the present annual rate of shell planting (764,000 bushels) over 300 years would be required to cover this entire area. In other words, the quantity of shells now annually available is sufficient for planting only about 700 to 800 acres of bottom.

This same analysis may be applied to the efficacy of seed planting operations. As pointed out previously, the State in recent years has been planting an average of 47,000 bushels annually on the public bars. Since it requires approximately 500 bushels of seed oysters efficiently to stock an acre of bottom, the average annual quantity of seed planted by the State has been sufficient to cover barely 100 acres of ground per year.

The efforts of the State to stimulate oyster culture by private interests through leasing of submerged areas has met with only a small degree of success. The State laws that are now in force are so restrictive

in character that it is almost impossible for private interests to engage profitably in large-scale planting operations. The grounds available for leasing are to a large extent unsuited for such purposes, which, together with the small maximum size of area leasable and the restriction against the negotiation of leases by corporations and joint-stock companies, have materially retarded the development of private oyster culture in Maryland. The lack of adequate and efficient police protection, and the demoralizing competition of the small ungraded oysters taken from the public bars have also discouraged many would-be lessees. As a result of these many unfavorable circumstances, the total area under lease has at no time in the State's history been as much as 10,000 acres. In recent years the total acreage under lease has shown a slow but gradual contraction, with that for 1934 being on practically the same levels as in 1928.

Despite the State's constructive activities, the oyster production has continued to decline, reaching in 1933 the lowest levels on record. Judging from the above discussion, it should be obvious that the present State policies, due to their limited effectiveness, can scarcely be relied upon for a restoration of the oyster bars of Maryland to the high degree of productiveness they once enjoyed.

Comparative importance of private and public oyster culture - The legal provisions in Maryland governing the leasing of submerged lands for oyster culture differ materially in some respects from those in most of the oyster-producing States, especially in those with a large portion of their production coming from private beds. In most of those States larger areas of land may be leased, corporations and joint-stock companies may lease such lands for oyster planting, and, as a general rule, there are certain specific requirements for planting upon leased areas. In order to point out the relative importance in the various Atlantic and Gulf States of private and public oyster bars, certain pertinent observations are presented herewith.

From the data shown in Tables 7 and 8, it will be noted that

during the four-year period from 1929 to 1932, inclusive, 47.4 per cent of the volume and 68.2 per cent of the value of the entire oyster production of the Atlantic and Gulf States were obtained from private beds. This situation indicates the higher per bushel value of the oysters taken from private grounds in contrast to those taken from public fishing areas. This contention is borne out by the figures in table 9, which show the average per bushel value of oysters taken from private beds, in the group of States named, to have been $0.99 in comparison with an average per bushel value of only $0.42 for those taken from public bars.

It is important to note that all of the important oyster producing States shown in table 7, with the exceptions of Maryland and Mississippi, obtained the major portion of their production from private beds. The concentration of private oyster-culture is noticeably apparent in the New England and Middle Atlantic States and in Louisiana, where the volume of the catch from private grounds exceeds 90 per cent of the total production. The average per bushel value of the oysters taken in these States is also generally higher than the average for those States where the greater portion of the production comes from public bars.

The information given in table 10 illustrates the financial loss that is being suffered by Maryland oystermen through the State's failure to produce a quality product. In 1931 the average value per gallon for Maryland fresh-shucked oysters was $1.17. In that same year the average for the Atlantic and Gulf States as a group was $1.50; for the New England States, $2.20; for the Middle Atlantic States $2.06; and for Virginia, $1.47. If the 1,858,114 gallons of oysters shucked in Maryland in 1931 had merely the average value for the Atlantic and Gulf States as a whole, the financial position of the oystermen and packers would have been improved by at least $600,000. These statistics demonstrate again the fact that those States, where a large portion of the oyster catch is obtained from private grounds, generally receive a higher price for their productions.

The comprehensive character of the data presented in the four tables mentioned above renders unnecessary a full discussion here. It is recommended that their contents be given the most careful study and consideration.

Necessity for change of policy in Maryland - The comparisons presented above indicate that Maryland is confronting a competition in oyster production that may, because of its character, jeopardize her position as one of the leading oyster-producing States. This position has been maintained in the past almost entirely upon the production of the public beds of the State.

On the other hand, the strong competitive position of certain other leading oyster-producing States is being safeguarded and strengthened by an effective encouragement of private planting, and by supplementing the catch from public beds by an extensive production that has resulted from the development of private beds.

In view of the extensive private planting operations that are being conducted in certain other leading oyster-producing states, it is becoming increasingly apparent that Maryland's present position as a leading oyster producer can be maintained in the future only through a radical revision of present policies.

From previous statements contained in this introductory material, it should be clear that it is manifestly impossible for the State, except at great expense, to undertake any program of restoration that would in any substantial measure bring back into productivity the extensive areas that are now barren. It should also be apparent that under present leasing laws private culture will not be developed to any appreciable degree.

The only practical alternative to a continuation of present policies, would be for the State to expand its efforts as far as possible towards restoring the public oyster bars and to supplement these activities by providing, through amended and new legislation, a fundamental structure for the development of bona fide private oyster-planting operations on a much more extensive scale than has yet been undertaken in this State.

RECOMMENDATIONS

1. RESURVEY OF OYSTER BARS.

To provide for more efficient policing, for the determination of areas suited for developmental purposes, and for guidance in formulation of conservation policies, it is recommended that a resurvey be made of the charted oyster bottoms of the State. It is suggested that the new survey be undertaken in cooperation with the United States Bureau of Fisheries. In the conduct of the resurvey there should be included at least one practical tonger or dredger thoroughly familiar with local conditions in the several regions.

2. DEVELOPMENT OF SEED AREAS.

Whereas Maryland is, in a large measure, dependent upon other states for seed oysters, especially in the lower bay regions and in the coastal section of Worcester County, it is recommended that the present designated seed areas north of a line drawn northeasterly from Seven Foot Knoll above the general tonging and dredging areas, should be extensively developed for the production of seed oysters. In addition, several barren, but once productive areas, such as upper-Honga river, Dorchester County, and certain sections of Eastern Bay, Queen Anne's County, should be developed into seed areas.

3. DISPOSITION OF SEED OYSTERS.

As a measure toward rehabilitating Maryland's oyster industry, it is recommended that the seed oysters produced on the areas to be intensively developed should be disposed of by the administrative authorities in the following proporations: 60 per cent of the entire production should be planted on public bars, chosen because of their special adaptability to produce quality oysters in substantial volume, the planting to be equally divided between dredging and tonging grounds, while the remaining 40 per cent of the total seed output from these areas should be made available for private purposes. It is further recommended that

the months of April and May should be designated as the season in which seed oysters may be lawfully taken from the public beds, and that the seed oysters thus obtained should not be sold outside of the State.

4. SHELL PLANTING.

In that shell planting has produced tangible results in certain sections of the State, especially on seed areas, it is recommended that this policy be continued to the extent of the ability of the State and the oyster industry to assume the financial burden involved. In future shell planting activities, however, greater care should be exercised in the selection of suitable areas for development so as to avoid the wasteful practice of smothering out growing oysters, and to discontinue the placing of shells in sections having insufficient quantities of brood oysters.

5. SPECIAL CONSERVATION FINANCES.

In order to finance the suggested program for large scale transplanting on public beds of oysters from seed areas to public beds, it is recommended that the administrative authorities grant permits to the dredgers and tongers of the State to operate during April and May for purposes of gathering seed; sixty per cent of the seed oysters taken from such areas to be transported and planted on previously designated bottoms under proper supervision; and the remaining forty percent of the total catch to become the property of the fishermen operating under permission. In view of the fact that Maryland's fishery industries are carrying a heavy tax burden, and since the revenue now accruing to the Conservation Department can be made to cover essential administrative and developmental work, it is also recommended that no additional taxes or fees be levied on these industries under present conditions.

6. INADEQUACY OF PRESENT LEASE LAWS OF TRIBUTARY WATERS.

Since a Maryland oysterman cannot lease areas of sufficient size in tributary waters, thirty acreas being the limit, with which to conduct a planting business successfully, and since it is generally

known that most of the successful planters in the State are now holding their ground by means not only unsatisfactory to them, but, in many cases, illegally, there should be changes in the present oyster laws to permit of larger holdings. It is recommended that the lease law for tributary waters be amended to conform with that now in operation in Virginia; (a) by which two hundred and fifty acres may be acquired in any one lease and (b) such holdings may be acquired by individuals, joint stock holders, or corporations, provided such individuals are citizens of the State and that holding bodies, as such, be organized under the laws of Maryland. It is further recommended that discretionary power be vested in the conservation authorities to determine, whether or not a given section, having been declared barren, after adequate survey, is available for leasing when qualified application for same has been made. In addition, discretionary powers should be given the conservation authorities whereby they may cancel leases when bottoms held under them are not being used for the planting, the holding, or the fattening of oysters.

7. ADDED AREA FOR LEASING.

Many of the areas now held in the State for oyster culture are utterly unfit for planting purposes, while several thousand acres of ground formerly highly productive lie fallow and are now entirely unproductive, only because their use for private culture is not permitted by existing laws. The State's present supply of large oysters contrary to the general understanding, is obtained principally from the waters of Long Island Sound, New Jersey and Virginia, and not from Maryland beds. In view of these conditions, it is recommended that the present unproductive areas lying in the Chesapeake Bay, between Plum Point and Cove Point, off of Calvert and Dorchester Counties, should be rendered subject to lease, thus making them available for private oyster culture. In Sections 4 and 5 of this report, recommendations were made in anticipation of developing under private management the above mentioned area, so as to create a

public bars, and to cover the expense of transplanting the sixty percent of seed oysters to be allocated to the public beds for the benefit of tongers and dredgers. Additional funds for transplanting operations will become available through the payment by lessees of rental fees and production taxes as now established, thus making this part of the projected program self-supporting.

8. ADDITIONAL POWERS FOR CONSERVATION AUTHORITES.

Since most of our natural resources fluctuate in abundance from season to season, or even within a single season, according to natural phenomena, as well as in the matter of supply and demand, and since the unyielding nature of many conservation laws operate against the public interest, it is recommended that there should be vested in the conservation authorities discretionary powers related to seasons, methods, uses, areas and similar variables involved in conservation administration.

9. LEASING OF THE SEASIDE AREAS IN WORCESTER COUNTY.

In view of the fact that the natural inlet at Ocean City, connecting the inland waters of Worcester County, with the Atlantic Ocean, has been made permanent, through cooperative Federal and State agencies, thereby assuring suitable conditions for the development of new fishing areas, it is recommended that the available charted barren bottoms of this region be leased for developmental purposes as soon as the conservation officials can effect the necessary arrangements, in accordance with the following conditions: (a) That leasing should cover the heretofore unproductive areas embraced by the Isle of Wight Bay, the Sinepuxent Bay, and the reaches of the Chincoteague Bay, north of a line drawn from Public Landing to Broken Marshes (Robin's Marshes), and thence due East to the beach; (b) That below this line of demarcation leasing should be delayed until the full effect of the inlet on the oysters located there, on long established beds, can be determined, since at this time there are indications of unfavorable results growing out of the construction of the inlet which may require early readjustments.

10. CRAB RESOURCES.

Since the blue crab resource of the Chesapeake Bay has declined materially during the past two years, and in order to avoid in the crab industry a repetition of such a serious situation as that experienced in 1925, it is recommended that the following suggestions be enacted into law, Worcester County to be exempted: (1) that it be made illegal to capture male hard crabs for commercial purposes which measure less than five and one-half inches, the present legal minimum being five inches; (2) that the season for taking crabs in the waters of Maryland be established to include the period from May 1 to October 31, inclusive, thereby eliminating the month of November from the crabbing season.

11. COOPERATION WITH VIRGINIA.

Conservation of Chesapeake Bay resources is an essentially interstate matter involving Maryland and Virginia. The oyster industry of America is now in a destructive slump without relief in sight. The responsibility for these conditions largely rests upon the oystermen of the two States named. Inferior stock, absence of established standards of quality and size, obsolete business methods, and lack of cooperation within the industry at large to effect necessary reforms, are the outstanding characteristics. The crab industry, largely confined to the Chesapeake Bay also repeatedly suffers from the same unfavorable conditions. Because of the marked need of complete cooperation and understanding on the part of the two States, it is recommended that the Governor of Maryland initiate a conference of the Governors of the two States, their conservation officials, and representatives of the crab and oyster industries, in order that more satisfactory conditions of cooperation may be established for the seafood industries.

CHAPTER 1.

RESURVEY OF OYSTER BARS

Area of Maryland's "natural" oyster bars - In the original survey and charting of the oyster bottoms of Maryland, frequently referred to as the "1906 Survey", made by the U. S. Hydrographic and Geodetic Survey and the Maryland Oyster Commission, cooperating, all bottoms which were known as "oyster rocks" or "oyster bars" were included. Not only those bottoms which were productive at the time, but those whose texture or construction gave indication of once having been productive, although actually barren, were included as well. As a result of this work and other surveys, approximately 265,000 acres of bottom were charted. This acreage, by law, was set aside as public grounds to be held for purposes of public fishing. No changes in this acreage have since been made.

Decline in production on "natural" oyster bars - The original acreage of public grounds included all the areas which had been fished during the decade of 1880 when oyster production in the State reached its peak. That is, the public oyster grounds of 1933, with a production of less than 2,000,000 bushels are, in extent, as great as they were in 1880 when the production was at least five times greater. To express it differently, the acreage has remained unchanged during this period while the yield has fallen from 10,600,000 bushels in 1880 to 1,778,506 bushels in 1933, a decline of 83.2 percent (See table 1).

Depletion of "natural" oyster bars - As the yield of oysters from the bars declined from year to year, the decrease was not registered uniformly over the Chesapeake Bay and its tributaries. On the contrary, those bars which produced the better grade or quality of oysters were the first to be depleted and then made barren. One after another of the rocks which produced quality oysters ("Selects" and "Counts") was exhausted with a consequent shifting of intensive fishing operation

to neighboring beds. This shifting spread from Tangier Sound (1885), from whence our choicest oysters were obtained, to the fresher waters at the head of the Bay (1930). The Tangier area's production dropped until at present it yields 2,000,000 bushels fewer oysters per year and it is practically non-productive. The best estimates available indicate that this body of water produced not in excess of 24,000 bushels during 1933.

No figures similar to those sited in preceding paragraph are available to show the decline in production during this same period for individual rocks located elsewhere in the Bay. However, the region off Calvert County, between Cove Point and Chesapeake Beach, a section which once produced a very fine type of oyster, has become so exhausted that the bars in the vicinity of Flag Pond, Governor's Run, Dare's Wharf, Plum Point, and like rocks across the Bay, do not offer a catch per unit effort justifying the work.

An experienced observer, placed in a commanding position in this region for a two weeks' period immediately before the Christmas (1934) holidays, when the demand is strongest, observed during eleven working days, that only eight dredge boats made a serious effort to take oysters from the points named. Nine other boats made "trial licks" and sailed away in search of better grounds, as did the first after their failure. Observations were made in the Fall of 1932 with similar results. These facts substantiate the general claim that the dredge fleet almost entirely avoids this section. The Chesapeake Biological Laboratory estimates that these same areas are capable of producing 1,750,000 bushels of oysters per year, or: (1) approximately as many oysters as are now produced in New Jersey, a large part of which are marketed by Marylanders, as being produced in Chesapeake Bay, because of the failure to produce large oysters at home; and (2) approximately as many oysters as are now produced annually in all of Maryland. This situation is heightened by the fact that potentially productive areas in the State, at least five times as large as the Calvert bars, are likewise fallow or non-productive.

State's most productive dredging grounds now threatened - The dredge, while more efficient in harvesting oysters, is more destructive to the beds than are tongs. That is why the Bay bars, where dredging operations have been permitted from the start, have suffered greatest depletion. During the earlier days of the industry the up-Bay oysters, such as "Tea-tables" and "Tolchesters", went into the canning trade, not being considered satisfactory for shucking (raw) stock. Records for the current year show that the dealers of the State must depend upon oysters from the fresher waters, formerly not used at all because of size, to supply their trade. The last stand of the Bay's natural oyster supply, in quantities, is now being intensively fished, at least on the dredging grounds, and the threat is a serious one.

Non-productive area contributed to inefficient law enforcement - It has been estimated by University of Maryland biologists that approximately one-fifth of the public oyster bars in the Chesapeake proper are now producing in quantities which attract dredge boats and that the remaining four-fifths have ceased to produce. The present policing system requires that these non-productive areas be policed along with the others, thus contributing to the lack of efficiency in law enforcement. Should a resurvey be made it would be possible to establish those sections which should be policed, with resulting efficiency and economy. In addition, through establishing definitely the areas which still produce and, therefore, afford brood stock, sounder policies for public bed development purposes could be formulated. By delineating the absolutely barren and non-productive sections a policy may be worked out whereby private capital could be interested in the problem of restoring Maryland's oyster industry.

Impartial resurvey of oyster bars advantageous to oystermen - A resurvey of the oyster bottoms of Maryland, because of the vast changes that have taken place since the old survey, would be fair to the watermen and should react in their favor since it would afford the better policing they desire, sounder conservation policies which they deem essential, and

an opportunity to develop, by State shell-planting or otherwise, only those areas capable of development rather than spread the limited effort out over vast territory much of which is now beyond redemption by the shell-planting method.

To safeguard completely the interests of the men who earn their livelihood from oystering, the services of competent out-of-State agencies such as the U. S. Bureau of Fisheries and the Geodetic Survey should be secured to do the work. As a further safeguard to the watermen's interests in the matter throughout the survey operations, which would require approximately one year for completion, it should be understood that at least one practical and reliable man, chosen by local groups of oystermen, should be present when observations are made in a given section so that his judgment and advice might be available in arriving at decisions.

CHAPTER 2.

DEVELOPMENT OF SEED AREAS

Depletion of Maryland's seed-oyster bars - Seed oysters produced in Maryland thrive in waters located from Virginia to Connecticut, and planters throughout this territory give them preference when a dependable supply is available. It is generally acknowledged among the oystermen that reckless sale of small oysters during the 1880-1900 period to New England planters, was a basic cause of depletion in Maryland. According to the 1929 annual report of the Maryland Conservation Department, there were shipped north, for planting in the Spring of 1879, 2,178,750 bushels of seed oysters. The exportation of such vast quantities of seed oysters is one of the fundamental reasons for the destruction of the State's aquatic wealth.

Coastal planters at this time can afford to pay as much per bushel (i.e. 20 to 30 cents) for the up-Bay product to be used for seed as can local dealers who place them in the shucked oyster trade with depressing effect on the market. However, such planters do not compete for the seed, since production of this type of oyster is extremely variable, as is shown by the fact that during such years as 1929 and 1930 no seed were harvested at all, while in 1934, 167,094 bushels were produced. Seed in large quantities from the same areas were sold every year without interruption from 1880 until 1904.

Comparison of seed production in Maryland and New Jersey - Through advanced planning the state of New Jersey is no longer dependent upon Maryland and other states for her seed oysters. The comparatively small acreage upon which their seed could be grown was developed by the state to the fullest extent. A constant and dependable supply of seed was made available and the industry there has grown in direct proportion to the yield of seed until the Delaware Bay now is the leading producing area. Maryland, with its vast acreage unusually well suited to seed production

is now producing 45,694 bushels per year, the average for six years, 1929-1934, as set forth in the Twelfth Annual Report, Maryland Conservation Department, page 20. New Jersey at the same time is producing an average of approximately 2,250,000 bushels of seed per year. Maryland with its greater potential seed producing acreage is actually producing less than 3.0 per cent as many seed as New Jersey. It is generally conceded that Maryland bottoms are of a better type and quality than are those of New Jersey. The difference, of course, lies in the policy of management. Maryland oystermen go to New Jersey in numbers during seed capture season, finding it necessary to leave the Chesapeake to secure employment.

Restoration of seed producing areas readily possible - Experimental tests, by means of shells placed in wire baskets, and by physical and biological examinations, made by the State Laboratory, indicate that the present yield of seed oysters in Maryland may be increased fourfold within a three-year period by a change in policy in connection with the present public shell-planting operations. This could be accomplished by diverting shells from bottoms which have not demonstrated marked possibilities in quality production and placing them on the seed areas. In addition it has been abundantly demonstrated that the upper section of Honga River, an area of 3,000 acres in Dorchester county, and approximately the same acreage in Eastern Bay, east and south of the Parsons' Island - Crab Alley section, now non-productive, can be developed immediately at a very reasonable cost. Such work could be done by planting shells at the rate of 1,000 bushels per acre.

One demonstration is here cited. Under the direction of the State Laboratory, the 1,000 acre Experimental Area in Honga River, created by the Legislature in 1931, had 42,000 bushels of shells planted on 50 acres of bottom over a three-year period. Four thousand bushels of seed oysters were removed from this area early in the fall of 1934, being taken from a section of approximately four acres. It was estimated at the time by those working on the seed that at least 50,000 bushels have been produced

on this ground which previously had not produced oysters for years. Development of such areas as these along with the established seed areas would easily restore Maryland's seed production to its one time high level and meet, in turn, not only the needs in the State, but restore the trade it once held out of the State.

Provision for adequate seed areas - As indicated, the present bars designated as "Seed areas", all of which lie above the general tonging and dredging grounds, and such places as those in the Honga River and Eastern Bay, discussed above, are large enough in area to produce a sufficient quantity of seed oysters for a twenty year planning period.

CHAPTER 3

DISPOSITION OF SEED OYSTERS

Sufficient acreage available for both public and private planting - The maintenance and development of public oyster grounds for both dredging and tonging operations are an outstanding feature of this Conservation Plan. Bottoms now producing and those with decided possibilities should be kept intact for the use of the public. Only bottoms which are barren and without reasonable prospect of rehabilitation, except by excessive cost to the State, are recommended for leasing purposes. Since there are approximately 265,000 acres of charted bottoms there is sufficient room for both public and private operations and the two enterprises should benefit each other.

Plan will aid both public and private operations - Since oysters of acceptable sizes ("Counts") are not, and by the very nature of the methods of operating cannot be grown on public beds in this or other States, privately grown large stock will help to restore the industry, while the demand for small oysters, primarily the chain store outlet, will not be affected. Private planters will have to carry the burden of rehabilitation on such grounds as they may lease, which burden, for the next few years at least, will be made lighter by the American Oyster Producer's Credit Association, a Government agency organized to finance and assist private oyster planting. The funds of this agency are not available for public planting purposes.

Potential production under intensive public and private planting operations - As indicated above, it has been demonstrated repeatly by competent state authorities that seed areas can be developed and their yield greatly increased. By limiting shell planting to bottoms which are abundantly supplied with brood stock, that is, by placing shells only on grounds which give definite assurances of a catch, and using the remainder

of the shells available for seed bed purposes, it is estimated that 5,000,000 bushels of seed oysters could be produced annually in the State, within a five year period. What this means can better be understood when we consider that Maryland's average annual output of seed for the past five years has been only 45,694 bushels. Equitable distribution of this added yield of seed between public and private beds should increase the States' annual yield of merchantable oyster to approximately 6,000,000 bushels, or a potential annual production of both market and seed oysters aggregating over 10,000,000 bushels within a ten or twelve year period. In the course of producing this vast supply of oysters, the public fishermen would be called upon to capture and handle all of the 5,000,000 bushels of seed and between 5,000,000 and 6,000,000 of bushels of merchantable oysters. Private industry will be expected to produce between four and five million bushels of large oysters only.

Equitable distribution of seed oysters grown on public beds

In effecting the projected program of production, the greater part, sixty per cent should go to public beds in the Bay and the rivers. Forty per cent of the seed should be made available by the State to planters offering the highest bids, and according to a fixed administrative policy. It is anticipated that the allotment to private interests, although much smaller, will produce under farming conditions as many oysters, by measure, as the larger plantings made on public beds, since, in the latter type of production, oysters are taken as far as possible as soon as they reach legal size, whereas on private beds they are held for two or three years in order to assure size and quality.

Care in selecting grounds for public plantings - In connection with the planting of seed oysters on public beds, the Conservation Commission should be called upon to use every discretion in choosing grounds by and with the advice of practical oystermen in the various sections. Whereas shells should be planted only where there are living oysters or brood

stock, seed oyster should be planted on depleted bars.

Season for taking seed oysters - The months of April and May should be designated as the season for seed oyster handling so that employment would be afforded tongers and dredgers during the poorest part of the oyster year. During these months, about 5.5 per cent of the volume of the States oyster business is carried on.

Prohibition of out-of-State sales of seed oysters - While it is anticipated in this plan that within a five or six year period sufficient seed oysters will be produced in Maryland to meet local needs, it is recognized that, for the present, sale of seed out of the State should be prohibited. When a fair degree of rehabilitation of the public rocks has been accomplished and an adequate development of private culture has been accomplished for the State, added competition for seed oysters on the part of foreign planters would create a better market.

CHAPTER 4

SHELL PLANTING

Successes and failures in shell planting - Shell planting operations in Maryland have been highly successful in some, but not in other cases. Specific illustrations are as follows: (1) 60,000 bushels of shells planted on Harris Rock have not produced oysters at all. This planting was checked during five successive summers by a representative of the State University interested in the work and he reports failure for the project. (2) 9,000 bushels of shells planted on Middleground Bar in the Patuxent during 1932, and reported on by the same official, showed an excellent catch and subsequent increase in production for the bar in question. It was estimated that for each bushel of shells planted on this bar a bushel of oysters was yielded and that, after the culling operation, many of the shells remained on the bar to assure further catch. (3) 42,000 bushels of shells, planted on the Seed Experimental Area in the Honga River, where there was known to be an abundance of free swimming (larval) oysters, yields a bushel of oysters for each bushel of shells planted, and approximately 55 per cent of the shells remained intact after the culling operation was completed. (4) On a section of Carrol's Bank, a fine rock in the Patuxent, shells were planted on top of a fair supply of oysters. The result was that the oysters were smothered out and the bed injured rather than improved.

Brood oysters essential for successful shell planting - From the demonstrations cited, it is apparent that the success of shell planting is dependent upon the wise selection of areas chosen for development. Shell planting does not work successfully if carried on without regard to the conditions that obtain on the areas on which attempts at restoration are being made. A scientific approach through a State supported institution, the Marine Laboratory, has been made to this particular subject while the advice of practical men can be secured freely. Combining the

information from these sources, the selection of bottoms suited to developmental measures should be readily possible. It is patent, however, that barren bars cannot be made productive by shell planting alone. Brood oysters are as essential to the propogation of this animal in the water as is brood stock in agricultural pursuits. The degree of depletion of a given bar determines its fitness for rehabilitation. If totally barren an area must be supplied with brood stock as well as with shells.

An impartial survey of the shell planting activities of the State shows that approximately 4,000,000 bushels of shells have been returned to the bottoms since 1930. An analysis of the figures of production does not show an increase in yield of oysters in that period. However, it does show that the average decrease in production per year since 1880, some 300,000 bushels, may have been arrested. Greatest benefits from shell planting have come from areas which produce Maryland's least desirable oysters, a fact explained by the presence on such areas of an abundance of brood oysters. In the middle and lower sections of the Bay, including Tangier Sound proper, shell planting has been a failure even though in two or three instances a catch was obtained.

Shell planting most desirable on seed areas - As an emergency measure in times of distress, such as the present, appropriations by the State for purchase of shells to rehabilitate the oyster resources may be justified, especially if confined to the tributary waters and the areas in the upper sections of the Bay. The greatest value in shell planting is to be found in the development of seed beds to produce oysters which later may be transplanted to partially depleted beds upon which better quality oysters may be grown. To use shells to produce more and more of the type of oyster that is being marketed from several points in Maryland at the present time is to drive down still further the market value of the commodity and in turn force upon the watermen a wage scale upon which they cannot wholesomely live. The present countrywide depressed state of the

oyster business and the low consumption level (the per capita consumption in 1930 being 77.3 per cent less than in 1880) is generally considered to be due, in a substantial measure, to the quality of the product now sold from the Chesapeake, oysters in certain shipments made from Maryland having been found to contain as many as 760 to the gallon, when the Code standard set for this grade in the industry at large is a minimum of 270 per gallon. To commit the State to the burden of shell purchase to further this anamolous situation is to fail to recognize the principles involved.

Insufficient quantity of shells available for effective restoration - To those limited areas where worthwhile oysters may be grown for the market by the shell planting method, shells should be returned. Likewise, they should be placed on the vast areas where seed may be produced subsequently to be transferred to "quality" producing grounds. At the present rate of shell planting, it is estimated that at least thirty years would be required to develop even these limited areas. If private capital and initiative are not called in to assist in the problem of developing this resource it becomes obvious that, to start an upward trend in production, every shell taken from the waters should be commandeered and returned to the bottoms without cost to the State.

CHAPTER 5

SPECIAL CONSERVATION FINANCES

Committee's Recommendations involve no additional financial burden on the industry or State - In preparing its plans for rehabilitating Maryland's oyster industry, the Committee gave special consideration to those corrective measures that could be successfully placed into effect without the necessity for additional expenditures on the part of the State Government or the industry itself. This assumption was based largely on the fact that the oyster industry is already heavily burdened with taxation, and the revenue and appropriations accruing to the Conservation Department can be made to cover the essential requirements.

The basic features of the Committee's plan for financing its rehabilitory program involve the intensive development of seed areas as well as the public and private oyster-producing grounds. These activities are intended to be supplementary rather than competitive. The leasing of extensive areas for private culture would require large quantities of seed oysters to stock the leased beds. In order to meet this potentially enormous demand, it is recommended that seed areas be intensively developed. The revenue that would be derived from the sale to private planters of the recommended 40 per cent of seed oysters taken by the dredgers and tongers during April and May would be utilized by compensating the fishermen for taking the 40 per cent referred to and also to pay the cost of removing the remaining 60 per cent to public tonging and dredging bars.

CHAPTER 6.

INADEQUACY OF PRESENT LEASE LAWS IN TRIBUTARY WATERS

Necessity for leasing - While the efforts of the Conservation Department, through shell-planting activities and the transplanting of seed oysters from upper Bay areas, have been helpful to the industry, they will operate to maintain only the present inadequate supply; and it is very doubtful whether the production from the public bars can be materially increased, except at prohibitive cost to the State. On the other hand, it is recognized that the production of oysters in Maryland can be greatly increased by the development in this State, as in other important oyster-producing states, of bona fide oyster culture by private interests. The States that are offering the most formidable competition to Maryland in the country's oyster market are those which take most of their production from private beds, and which have attempted to safe-guard the future of the industry and to stabilize it on a high level by means of private planting.

Small maximum size of area leasable in county waters - The present law restricts the size of the area that may be leased by one person for oyster culture to 30 acres within the boundary limits of a county, except in Tangier Sound where the maximum is 100 acres. These areas, and those of smaller dimensions that are under lease, are so small as to be of comparatively little commercial importance. Operations must be restricted largely to tonging; and the constant use of the same ground, year after year, would tend to reduce its productivity. In such important oyster-producing States as New York and New Jersey, no maximum size of area to be leased is specified by law, while in Virginia the maximum area leasable in tributary waters is materially higher than that for Maryland.

Present methods of holding leased areas unsatisfactory- The Maryland law provides that no one person may lease, assign, or in any other manner acquire a greater amount of land than 30 acres situated within the territorial limits of a county (except Tangier Sound) for the purposes of oyster planting. It is reported that many Maryland planters are operating leased areas which are held in the names of other persons, employees, relatives, friends, etc. The unwise legislative restrictions referred to above have forced the planters to circumvent the law. In addition to being illegal, this method of operating leased areas has one other serious disadvantage. Even if a planter should place seed or shells on the 30 acres of bottom held in his own name, and at the same time makes similar investments on areas leased from the State by others, but operated by him, it would not be possible for the planter to pledge as collateral for bank loans the investment on the bottoms held in names other than his own. This is due to the fact that the planter would not have title to the bottoms operated by him but leased by others, since the State law prohibits the acquiring of more than 30 acres by any one individual through assignment or any other method. Virginia, for example, permits the assignment or sub-renting of leased oyster bottoms, although the maximum which one may so acquire is 3,000 acres. Such an area would be equal to more than one-third of the total acreage now under lease in Maryland.

Restrictions against the negotiation of leases by corporations and joint-stock companies - The Maryland law prohibits the leasing to corporations or joint-stock companies of public bottoms for oyster planting. This legal restriction tends to retard any markedly effective rehabilitation of the State's oyster resources, through the elimination of those interests that possess sufficient capital to conduct large scale operations.

In the States producing large quantities of oysters from private beds, such as New York, Connecticut, Rhode Island, Virginia, and Louisiana, corporations are permitted to lease public bottoms for oyster culture, New Jersey in this respect, being the principal exception. In such States it is generally provided that corporations involved must be chartered in the State in question, or at least have their principal place of business located there.

Added powers for conservation authorities would assist development of private planting - Under the present law, each application for leasing public bottoms for oyster culture purposes is subject to protest by the oystermen. That is, three or more persons may come into court and make oath that they have resorted to the particular area in question for a livelihood during the previous five years, and the Court is required to declare such grounds to be natural oyster bars and, therefore, not available for leasing. It is felt that the present practice operates against the public interest as well as that of the oystermen, and that authority should be vested with the Conservation Department to determine, after competent survey, whether a given bottom is barren and consequently subject to leasing.

There is also in Maryland a lack of any specific requirement imposed on the lessees to secure the execution of the legal provisions that leased areas must be used only for oyster planting and cultivation. The applicant for a lease must state that the desired ground must be used for that purpose. Once secured, however, the land may or may not be used for that purpose. In order to insure the full and proper use of the lands made available to private interests for oyster culture, the State should have discretionary powers to impose certain restrictions upon the lessees, and a failure to comply with the official regulations should result in the cancellation of the lease.

CHAPTER 7
ADDED AREA FOR LEASING

Change in State's fundamental oyster policy deemed essential - Long time planning for the management of renewable resources of a commercial type should aim not only to restore and enhance the industries involved, but the industries themselves ultimately should bear the expense of the restoration and maintenance to have conservation work become self-supporting. To call upon the State Treasury annually for grants to "save the oyster industry" by shell planting or other questionable methods when that industry refuses to save itself by cooperative activity and the application of principles working successfully in other states where this type of business thrives, is to continue a policy which admittedly has been of questionable value to date and has a highly uncertain future. Maryland has spent millions of dollars in its attempt to develop its oyster resources, but the results so far have been negative. This fact alone justifies a change in methods. A liberal policy should be embraced for the leasing of some of the areas impartially surveyed and found to be barren and without immediate possibilities for development through shell planting.

Maryland is outstanding among the States which produce the bulk of the country's oyster supply in not permitting private capital and business methods to share in oyster production through the development of grounds that are non-productive and without reasonable prospect of development by public means.

Should Maryland be dependent upon other States for her supply of large oysters? - As the result of a survey made by this Committee in the houses of eleven reputable oyster concerns in Baltimore, Cambridge and Crisfield, it was ascertained that the State's dealers are almost entirely dependent upon other states for the supply of "Counts" they distribute. Three of the houses studied shucked only "Standards", using their larger oysters to "bring up the count". It was estimated that 89 per cent of the supply of large oysters shipped from Maryland, as Chesapeake stock, were grown out-of-

state and that the State's dealers, to hold the trade built on the fine quality of the local product years ago, now find it necessary to truck oysters from points as far distant as Long Island Sound. In this awkward situation it is generally agreed that fine large oysters can be grown abundantly within easy reach of the dealers and to their benefit as well as to the benefit of the many watermen who would be hired to plant, catch, handle, deliver, and shuck the supply.

Present leasing policy untenable - Maryland's present policy for the leasing of oyster grounds is founded upon reasoning that is untenable. In the main, it permits private control of those bottoms upon which oysters have never grown and which, because of their consistency and general physical condition, offer minimum prospects of development. Many efforts have been made and much money has been spent in an effort to produce results on such bottoms, and the history of the industry shows repeated failures in such attempts. In rare cases it has happened that a lessee in the lower Bay has been able to acquire grounds that were developable. The success of private planting of oysters on such grounds adds to the evidence which clearly points to the necessity of a change in the laws that will permit the leasing of some of the barren areas fit for development. At the head of the Patuxent, in the lower reaches of the Wicomico and Nanticoke and in the Pocomoke Flats section leasing of limited areas has gone far to stabilize production in a local way. In such localities employment is more certain and the watermen appreciate the added opportunity for employment. Oysters from such beds are of the best quality now produced in the State.

High productivity of leased areas under proper management - The Conservation Department's records, with 8,365 acres under lease in 1934, indicate that Maryland has embraced a substantial policy for leasing oyster bottoms. When these figures are compared with those of New Jersey, to cite an instance, the failure of the policy is apparent. New Jersey, with ap-

proximately 35,000 acres under lease, produces in a normal year over 2,000,000 bushels of market oysters, unassisted by natural bars. Maryland with about 265,000 acres of public beds and over 8,000 acres of leased area produces about the same quantity.

With the exception of the small acreage leased, referred to in the preceding paragraph, the entire holdings under private control are devoted either to riparian interests or to purposes of "laying down" oysters, that is, they are used by individuals for storage purposes when they desire to carry the oysters some days before marketing them. On the decidedly greater part of privately held bottoms seed oysters can neither be secured nor grown to maturity. Such bottoms are utterly unsuited for oyster culture.

Unusually barren "oyster bars" available for leasing - It is generally agreed among the dredgers that the section of the Bay off Calvert County has been extremely depleted and that the bottoms here are not sufficiently productive of oysters to justify dredging operations. The water in this section is too deep to permit satisfactory tonging operations. Thus that large group of oystermen employed at tonging would not be affected by its management. The leading dredge boat operators have suggested that much of this section be set aside for purposes of leasing so that the value of this type of conservation work may be determined. It should be recalled in this connection that private development must, in harvesting the crop in deep water, use dredges, boats and men thus making for added employment in this class of craft and oystermen. In addition to the common experience of the dredgers, observations especially directed to the end of determining the extent of dredging operations in the Calvert Section show that it has dropped into disuse. Using laboratory equipment and facilities, along with an equipped commercial dredge boat, two thoroughgoing efforts were made to determine the productivity of the three main bars in the section - Flag Pond, Governor's Run and Dares'. Pulling heavy dredges for a minimum of three-eighths of a mile oysters were taken, as indicated in the following

table, in such small quantities that, for sake of simplicity, they are recorded numerically rather than by fractions of bushels.

Results of test-dredging off Calvert Shore, November, 1934:

Day	Place	Estimated distance of haul	Number and quality of oysters taken
11	Governor's Run	Three-eighths mile.	Seven oysters, very large
11	" "	One-half mile.	Nine oysters, very large.
11	" "	Three-eighths mile.	Two large oysters.
11	" "	One-half mile.	Eleven very large oysters.
11	Flag Pond	Three eighths mile.	Twelve oysters. Five of them small.
11	" "	One-half mile.	Twenty-six oysters. About half of them large.
11	" "	" " "	Twenty-one oysters, mixed size.
12	Dares'	" " "	Thirty-seven oysters, mixed size.
12	"	" " "	Thirty-two oysters, mixed size.
12	"	Three-eighths mile.	Twenty oysters, nine of them large.

Restoration of certain barren bars through leasing - From the table it becomes apparent that on Governor's Run bar oysters have become so depleted that it is now difficult to find even representatives of the abundant supply of superior oysters that came from the same area 30 years ago. Governor's Run bar is the most completely exhausted area in the section. However, the neighboring bars, as indicated in the table, are barely in better shape. A haul of the dredge for the same distance as one of these areas, under production conditions would have filled it completely to yield three or four bushels of oysters. To allow these fine beds to lie fallow when capital and private management wait to develop them, is to waste heritage. During the years of 1918 and 1919 the Conservation Commission expended a sum in excess of $48,000 in an effort to restore the Governor's Run bar through the planting of shells and seed from other bars. The policy was introduced by practical oystermen and put into effect by a

very substantial and experienced leader of that group. The failure, with the loss of the investment, was complete. More than this! Repeated efforts by the Marine Laboratory to secure catch on these areas have failed according to published reports of the Conservation Department. There is no indication that these beds will restore themselves naturally, that shell planting will benefit them in the least or that money rationally spent will rehabilitate them to a reasonable extent. Essentially this whole section is suited to private planting.

Recommended plan to be self-supporting - It is estimated in this Plan that the Calvert-Dorchester section, if made subject to leasing, would be made sufficiently productive in a ten year period to carry the entire burden of conservation in Maryland, that is, the burden of rehabilitation, not of just maintaining something of a supply of oysters. With a five cent production tax placed on planters, in addition to the rental fee of one dollar per year, and the anticipated production level of 1,750,000 bushels is reached by 1945, the State would be relieved entirely of appropriations, for the income from this source would more than meet the running expenses of the administration. It would, in addition to purchasing the 40 per cent of seed grown on public beds, thereby paying for the transplanting of seed to public beds, contribute an annual revenue to the State of some $75,000. Such an income in addition to that derived from present and anticipated leasing activities elsewhere, combined with fees, the present bushel tax, shell tax, etc. would if kept in effect contribute substantial sums each year to the State's general funds. Planters welcome the opportunity to operate on worthwhile areas that may be made available to them under the conditions outlined.

CHAPTER 8

ADDITIONAL POWERS FOR CONSERVATION AUTHORITIES

Inflexible laws often reduce effectiveness of Conservation efforts - An examination of Maryland's conservation laws will reveal a large body of various regulations governing the commercial fishery operations of the State. While certain of these laws are basic in character, providing for the creation of the Conservation Commission, the enumeration of its powers and duties, licensing provisions, the imposition of fines and penalties, others consist primarily of what might be termed administrative rules and regulations such as the season of capture, type of equipment to be employed, size limits, et cetera. Except in comparatively few instances is the Conservation Commission empowered to use discretionary judgment in the formation of such administrative policies, which are now specifically provided for by law.

The present conservation laws of the State have doubtless been enacted with the best of intentions on the part of the legislature, but often they are quite ineffective in coping with emergency situations, and frequently operate against the public interest. The situation is due primarily to the fact that the Legislature normally convenes only once in every two years, whereas practical situations are constantly arising which require immediate action if the interests of conservation are to be served. By the time legislative action is secured it frequently happens that a resource in a particular locality has either been destroyed or so materially impaired that the passage of remedial laws is of comparatively little effectiveness.

Need for additional discretionary powers of Conservation authorities - If the present conservation laws which are strictly administrative in character should be amended to vest in the Conservation authorities discretionary powers in regard to seasons of capture, methods and equipment to be employed, the opening and closing of certain areas for public fishing, et cetera, the production and conservation of our marine

[illegible]

[illegible]

[illegible] large

body of [illegible]

the [illegible]

that [illegible]

powers and [illegible]

lower [illegible]

and regulation [illegible]

[illegible]

[illegible]

resources would be materially increased.

In undertaking a broad program of rehabilitation of Maryland's oyster industry, it would seem advisable that the Conservation Department be given greater discretionary powers than it now possesses. Any plan to restore effectively the depleted oyster bars of Maryland should include flexible provision for regulating the proper use of the areas which the State is attempting to rehabilitate. In other words, the areas where seed oysters or shells are planted should remain undisturbed for sufficient time to enable the bars to become adequately productive before being thrown open to the public; and where certain areas are being so intensively fished that their productivity is threatened, the Commission should have the power to prohibit fishing on such areas before they become seriously depleted. The Commission should also have power to designate the particular areas that are most suitable for development. Regulations governing the type of equipment to be used in public fishing operation should also come under the discretionary authority of the Conservation Department.

Since Conservation officials are in day-to-day contact with the actual conditions over a long period of years, they are generally in a better position to judge as to the wisdom of adopting specific regulatory measures than the members of the Legislature or any other official body would be.

The lack of discretionary powers for permitting the Conservation Department to determine officially whether a given oyster bar is productive or barren has been partially responsible for the slow and limited development of private culture in this State.

CHAPTER 9.

LEASING OF THE SEASIDE AREAS IN WORCESTER COUNTY

Permanent Ocean City Inlet Has Made Oyster Culture Possible Near Seaside Areas. - Legislation was enacted in 1933 whereby leasing of the major portions of the oyster bottoms in Worcester County was made possible. It was specified in the law that leasing should begin when it had become established by the Conservation Department that the Ocean City Inlet, cut through the beach by the August, 1933, storm, had been made permanent by certain State funds made available for the purpose. The Inlet is now considered as permanent by the engineers and the construction agencies in charge of the work. The Isle of Wight Bay, the Sinepuxent Bay, and the upper reaches of the Chincoteague Bay, formerly too fresh to support oyster life, are now sufficiently salt (Minimum salinity of 1.0010, or the freshest waters are saltier than that in the region of Cedar Point) to make possible the cultivation of a fine quality of oyster. The physical and biological features of the water, according to a recent survey of the Biological Laboratory, are likewise encouraging. The watermen of this county, with the exception of a small area, are anxious to take up the holdings and many applications for ground have been made. There are no natural or public oyster beds in Worcester County.

Adverse Effects of Inlet on Certain Sections - In the lower region of the Chincoteague Bay there is interest in the proposed leasing, but, due to recent failure of their oyster beds, the watermen are fearful that the Inlet may have set up new conditions. It is a fact established by biologists (See 1934 Annual Report, Conservation Department) that the inlet has done some injury to oyster farming in the lower section of the Chincoteague Bay, that is, around Girdletree, Box Iron and Stockton. In these sections oyster farming has been the practice since the earliest days of the industry in America and normally growth and fall fattening are assured. Since the opening of the Inlet oyster growth has been

greatly arrested and the condition of the oysters on quite a few beds has rendered them unfit for marketing. While considerable promise is held out to those who wish to start oyster planting in the recently salted areas, it is not recommended in the Plan that leasing be encouraged in the old regions of production for the present. In the last named, salt is present in such concentrations as to be reassuring from that angle, a minimum density of 1.0011 being recorded. The difficulty seems to be in the tidal effects due to the location of the beds between two inlets. An immediate trouble is found in the unusually heavy attack on the oysters by the Boring Sponge, apparently a secondary source of trouble. However, before definite conclusions may be drawn in this connection further observations must be made. In actual practice the old established oyster areas are far below their standard of production and the problem of leasing them requires further understanding before action is taken.

Seaside Areas for Immediate Leasing - While it is recommended in this Plan that the newly created oyster beds in the upper reaches of Worcester County waters be leased forthwith it is felt that below a line drawn from Public Landing to Broken Marshes (Robins' Marsh) and thence eastward to the Beach, leasing should not be forced upon the planters at this time. The chief reasons are, in review: (1) The Inlet apparently has created a condition that has adversely affected the oyster beds. (2) The beds now are heavily seeded and it will be necessary to move the oysters on them to new beds unless local conditions change within a reasonable period. (3) Leasing is expensive, especially where the holdings consist of a number of small areas, as is the case in the section in question. (4) To lease the beds at this time would make it necessary for the planters in question to put up considerable money just at a time when they are experiencing most trying times and in many cases when they are unable to do so.

CHAPTER 10

CRAB RESOURCES

Relationship between the life cycle of the blue crab and the Chesapeake Bay waters of Maryland and Virginia - The blue crab spends a part of its life in Virginia waters and part in Maryland waters. Spawning takes place in the lower regions of the Bay, within the territory limits of Virginia. The young crabs, after hatching, gradually migrate northward to Maryland waters where full maturity is reached and mating takes place. After mating, the female crabs migrate to the lower portions of the Bay for spawning, while the male crabs usually remain in Maryland waters. From this brief analysis of the migratory character of the life of the blue crab, it would appear that the supply of crabs in Maryland is dependent upon the stock in Virginia waters, while the supply in the latter State is closely associated with the stock in Maryland waters. In view of this inter-dependent situation, it is important that complete cooperation should exist between these two States in regard to the protection and conservation of their crab resources.

How fishing practices in Virginia are affecting the crab supply - The volume of Maryland's crab production has not always obtained the high levels of recent years. The adverse conditions affecting the industries for some period prior to 1927 were of such a character as to actually threaten its existence. From the data presented in Table 11, it will be noted that the volume of Maryland's crab production in 1920 was less than one-half of that for 1904.

The great decrease in the crab supply was due largely to the taking of large quantities of sponge-bearing crabs principally from Virginia waters. This practice obviously destroyed the opportunity

for the development of millions of potential young crabs. Confronted with a serious crab shortage, the Legislature of Virginia in 1926 enacted laws making it illegal to capture the sponge-bearing crab at any time. Maryland had already enacted similar laws. A marked increase in the supply was noticed almost immediately after the passage of such legislation; and the production of crabs in Maryland increased from 9,646,361 pounds in 1925 to a peak of 36,938,783 pounds in 1930.

From these figures it is easy to observe the influence of the protective legislation on increasing the crab supply. In a comparatively short period the major problem affecting the industry had shifted from an inadequate supply to an apparent overabundance. This change occurred so rapidly that the industry was unable to adjust itself properly to the new conditions; that is, the crab packers as a whole failed to develop new markets for absorbing the increased supply. As a result of the glutted conditions in the primary markets, crab prices suffered a serious decline. To offset their vanishing profits, caused by lower prices, producers began to further increase production, thereby bringing virtual chaos to the industry's marketing mechanism.

In an effort to relieve this tense situation, the legislature of Virginia in 1932 repealed its protective legislation by enacting laws that would permit the taking of sponge crabs from the waters of the State at any time from April 1 to June 30 inclusive. While protests were made by Maryland and other interests, the pressure brought to bear in Virginia was apparently so great that the Governor approved these measures. It was contended by those supporting such legislation that the supply of crabs would not be materially diminished, and that the disastrous situation prior to 1927 would not again be repeated.

It is, of course, too early to determine the full effects of Virginia's unfavorable legislative action, but is is significant to

note from table 11 that Maryland's crab production decreased from a peak of 36,938,783 pounds in 1930 to 30,097,129 pounds in 1933. While official figures covering the operations for 1934 are not available, it has been reported that the volume of production had diminished considerably in comparison with that for other recent years.

Full cooperation should be given to Virginia in an effort to have her reenact the law protecting the sponge crab, and at the same time certain protective legislation should be enacted in Maryland to protect the female crab when migrating to Virginia waters during the fall months.

How fishing operations in Maryland are affecting the supply of crabs and crab meat - As previously pointed out, the female crab, after the mating period, migrates to the lower sections of the Bay. This migration is particularly noticeable during the fall months, especially October and November. At that time the female crabs travel in large schools, which makes them particularly subject to capture in sizable quantities. Inasmuch as one female crab will lay about about 1,750,000 eggs, it is apparent that the taking of a large quantity of such crabs will considerably reduce the potential number of young to be hatched the following summer.

At the 1933 session of Maryland's legislature the length of the season for taking crabs was extended to include the month of November, or the period during which female crabs migrate to Virginia in large schools. If the crabbing season is shortened to include only the period from May 1 to October 31 inclusive, a considerable expansion of the crab supply would develop; that is, a much larger number of potential egg-laying crabs would be enabled to reach the spawning grounds. It is also very probable that such action on the part of Maryland might be instrumental in securing the cooperation of Virginia in having that State reenact laws to prohibit the capture of sponge crabs at any time.

During this period of diminishing crab resources, it is important that every effort should be made to conserve the present sypply. It should be pointed out that crabs increase in size only through the molting process (shedding the shell) and that the taking of immature crabs reduces potential production. That is, if the smaller crabs were allowed to remain in the water for sufficient time to obtain maturity, they being of larger size would produce a greater volume for the same effort. Since the larger portion of male hard crabs are found in Maryland water, increasing the legal minimum size for taking male hard crabs would materially benefit local fishermen. The present legal minimum for taking of hard crabs is five inches, and since such crabs are immature, it is recommended that the minimum limit be increased to five and one-half inches, where full maturity is attained.

Exemption of Worcester County - In view of the fact that conditions in Worcester County differ materially from those of the Chesapeake Bay sections, the recommendations for amending the present crab legislation should not apply to that county.

CHAPTER 11

COOPERATION WITH VIRGINIA

Conservation of Chesapeake Bay resources is essentially an interstate matter involving Maryland and Virginia. The oyster industry of America is now in a destructive slump without relief in sight. The responsibility for these conditions largely rests upon the oystermen of the two States named. Inferior stock, absence of established standards of quality and size, obsolete business methods, and lack of cooperation within the industry at large to effect necessary reforms, are the outstanding characteristics. The crab industry, largely confined to the Chesapeake Bay also repeatedly suffers from the same unfavorable conditions. Because of the marked need of complete cooperation and understanding on the part of the two States, it is recommended that the Governor of Maryland initiate a conference of the Governors of the two States, their conservation officials, and representatives of the crab and oyster industries, in order that more satisfactory conditions of cooperation may be established for the seafood industries.

CHAPTER 12.

FURTHER STUDIES

Studies made on conservation methods and results to date have not been sufficiently complete to justify concrete recommendations on three vital points affecting Maryland's natural resources. It is felt by the Committee on Conservation that further study should be given to the conditions enumerated below:

1. Present studies point strongly to the desirability of having all agencies in charge of the State's resources, such as forests, game, fish, oysters, and mineral resources, brought into closer relationship, with their work more completely coordinated. Four distinct State departments, located in four different institutions, and working independently, now carry on the work of conservation.

2. Law enforcement in conservation work has in a large measure failed, especially in the marine fisheries. Special attention should be directed to the possibilities of reorganizing and consolidating all conservation enforcement agencies into one constabulary, with a head and personnel equipped for the work at hand rather than for special knowledge of conservation affairs. Motor vehicle officers and other such state agencies might well be included in such a plan.

3. The funds accruing to the Conservation Department from fees, licenses, rentals, etc., varying from year to year as they do, according to the fluctuations of nature, should not be lost at the end of the fiscal year as at present. Such monies should remain to the credit of the Department in order that its work may be carried on uninterruptedly in lean as well as in rich years.

STATISTICAL APPENDIX

TABLE 1

COMPARISON OF THE VOLUME OF MARKET OYSTERS PRODUCED IN MARYLAND WITH THAT FOR THE ATLANTIC AND GULF STATES AS A WHOLE, FOR VARIOUS YEARS FROM 1880 TO 1932.*

Year	BUSHELS		PER CENT DISTRIBUTION	
	Maryland	Atlantic and Gulf States	Maryland	Other Atlantic and Gulf States
@ 1932	1,950,339	12,177,821	16.0	84.0
@ 1931	2,339,207	11,756,405	19.9	80.1
@ 1930	2,307,563	14,977,292	15.4	84.6
1929	2,534,719	15,202,390	16.7	83.3
1924-1928	4,250,960	17,669,056	24.1	75.9
1918-1921	4,547,471	17,018,854	26.7	73.3
1910-1912	5,497,471	24,736,113	22.2	77.8
1908	5,830,000	25,173,000	23.2	76.8
1901-1902	5,685,561	25,310,921	22.5	77.5
1897-1898	7,254,934	24,721,644	29.3	70.7
1890-1892	10,450,087	26,671,155	39.2	60.8
1888	8,531,658	21,145,120	40.3	59.7
1887	8,148,217	19,624,243	41.5	58.5
1880	10,600,000	22,329,174	47.5	52.5

* General statistics for the oyster fisheries have not always been collected by the U. S. Bureau of Fisheries simultaneously for all the States, but during the period of canvass statistics were collected each year for certain States, and the production shown for a particular period has been taken as an average year. Of the data shown above, the periods 1890-1892, 1897-1898, 1901-1902, 1910-1912, 1918-1921, and 1924-1928, are taken by the Bureau of Fisheries to show production for an average year. Until 1901 no consistent or uniform effort was made to separate market and seed oysters. The production figures that are shown for years previous to that date, therefore, undoubtedly include some seed oysters.

@ Prior to 1930 it was the uniform practice of the U. S. Bureau of Fisheries to consider one bushel of oysters in the shell as the equivalent of seven pounds of meat; since that time, however, a separate conversion factor has been used for each State in the different years.

Authority: Various reports of the U. S. Bureau of Fisheries.

TABLE 2

APPARENT PER CAPITA CONSUMPTION OF OYSTERS IN THE UNITED STATES: BY DECADES, FROM 1880 TO 1930

Year	Population	Year	Oyster Production (Pounds)	Per Capita Consumption (Pounds)
1930	122,775,046	1930	86,255,610	0.70
1920	105,710,620	1918-1921	119,131,978	1.13
1910	91,972,266	1910-1912	173,152,784	1.88
1900	75,994,575	1901-1902	176,894,085	2.33
1890	62,947,714	1890-1892	185,448,735	2.95
1880	50,155,783	1880	155,059,968	3.09

Authority: Population -- Reports of the U. S. Bureau of the Census;

Oyster Production -- Reports of the U.S. Bureau of Fisheries.

TABLE 3

COMPARISON OF THE VOLUME OF THE MARKET-OYSTER PRODUCTION IN THE VARIOUS ATLANTIC AND GULF STATES, FOR 1880 AND 1932 #

Areas and States	Production (Bushels) 1932	Production (Bushels) 1880@	Percentage Distribution 1932	Percentage Distribution 1880
Total Atlantic and Gulf States	12,177,821	22,329,174	100.0	100.0
New England States	1,118,224	535,650	9.2	2.4
Massachusetts	42,618	36,000	0.4	0.2
Rhode Island	613,919	163,200	5.0	0.7
Connecticut	461,687	336,450	3.8	1.5
Middle Atlantic States	1,885,321	3,496,050	15.5	15.7
New York	862,322	1,045,300	7.1	4.7
New Jersey	953,634	1,975,000	7.8	8.8
Delaware	69,365	300,000	0.6	1.3
Chesapeake Bay States	4,239,778	17,437,320	34.8	78.1
Maryland	1,950,339	10,600,000	16.0	47.5
Virginia	2,289,439	6,837,320	18.0	30.6
South Atlantic States	1,278,354	368,600	10.5	1.7
North Carolina	210,395	170,000	1.7	0.8
South Carolina	507,950	50,000	4.2	0.2
Georgia	103,411	70,000	0.8	0.3
Florida	456,598	78,600	3.8	0.4
Gulf States	3,656,144	491,554	30.0	2.2
Alabama	358,007	104,500	2.9	0.5
Mississippi	2,384,621	25,000	19.6	0.1
Louisiana	719,338	295,000	5.9	1.3
Texas	194,178	67,054	1.6	0.3

Until 1901 no consistent or uniform effort was made to separate the statistics for market and seed oysters. The production figures for 1880, therefore, undoubtedly include some seed oysters.

@ The total for the Middle Atlantic States in 1880 include a production for Pennsylvania of 177,750 bushels, or 0.8 per cent of the total for the Atlantic and Gulf States. The production in this State for 1930 is included in the total for New Jersey and Delaware.

Authority: Computed from various reports of the U. S. Bureau of Fisheries.

TABLE 4

TREND IN THE VOLUME AND VALUE OF MARYLAND'S TOTAL OYSTER PRODUCTION, FOR VARIOUS YEARS FROM 1880 TO 1933, INCLUSIVE

Year	Bushels	Value	Year	Bushels	Value
1933	1,778,506	$ 738,197	1904	4,429,650	$ 2,417,674
1932	1,957,382	942,899	1901	5,685,561	3,031,518
1931	2,342,181	1,474,657	1897	7,254,934	2,985,202
1930	2,345,244	2,061,044	1891	9,345,058	5,295,366
1929	2,562,399	2,464,959	1890	10,450,087	4,954,746
1925	4,252,860	3,256,272	1888	8,531,658	2,877,290
1920	4,547,471	2,291,120	1887	8,148,217	2,683,435
1912	5,510,421	2,127,759	1880	10,600,000	4,930,476
1908	6,232,000	2,228,000			

Authority: Statistics for 1933 computed from the 12th Annual Report of the Maryland Conservation Department, while those for the other years shown were obtained from various reports of the U.S. Bureau of Fisheries.

TABLE 5.

THE NUMBER OF TONGER, SCRAPER, DREDGER, AND OYSTER-PACKER LICENSES ISSUED IN MARYLAND, FOR THE YEARS 1916 TO 1933, INCLUSIVE

Year	Tonger	Scraper	Dredger	Packer
1916	7,299	730	446	269
1917	5,562	378	309	194
1918	3,638	402	222	142
1919	5,232	407	322	267
1920	5,439	455	324	271
1921	6,230	533	261	272
1922	5,543	460	295	283
1923	5,396	420	362	268
1924	5,776	389	299	251
1925	5,156	406	265	207
1926	4,808	291	343	219
1927	4,874	279	282	206
1928	4,741	270	259	201
1929	4,598	223	188	186
1930	4,901	215	204	182
1931	5,483	164	87	180
1932	4,777	121	87	167
1933	4,163	113	62	165

Authority: Annual Reports of Maryland Conservation Department.

TABLE 6.

COMPARISON OF THE VALUE OF THE PRODUCTION OF CANNED OYSTERS IN MARYLAND WITH THAT FOR THE COUNTRY AS A WHOLE FOR THE YEARS 1921 TO 1932, INCLUSIVE.

Year	Maryland	United States	Per cent Maryland
1932	#	$1,007,624	#
1931	#	983,525	#
1930	@	1,936,862	@
1929	$193,266	2,732,478	7.1
1928	233,218	2,760,576	8.4
1927	126,972	2,367,949	5.4
1926	171,640	2,026,569	8.5
1925	703,689	3,721,159	18.9
1924	468,055	2,478,044	18.9
1923	606,973	2,720,073	22.3
1922	479,572	2,423,616	19.8
1921	778,435	2,179,271	35.7

No production reported for Maryland.

@ Date not available separately for Maryland. Values for North Carolina and Maryland combined amounted to $145,201.

Authority: Various reports of the U. S. Bureau of Fisheries.

TABLE 7

THE AVERAGE ANNUAL PRODUCTION OF MARKET OYSTERS IN THE ATLANTIC AND GULF STATES, CLASSIFIED ACCORDING TO PRIVATE AND PUBLIC BEDS, FOR THE PERIOD 1929 TO 1932, INCLUSIVE*

Areas and States	Total Production (Bushels)	Private Beds (Bushels)	Public Beds (Bushels)	Per cent Private Beds	Per cent Public Beds
Total Atlantic and Gulf States	13,527,980	6,415,860	7,112,120	47.4	52.6
New England States	938,690	930,940	7,750	99.2	0.8
Massachusetts	46,790	46,470	320	99.3	0.7
Rhode Island	431,720	430,930	790	99.8	0.2
Connecticut	460,190	453,550	6,640	98.6	1.4
Middle Atlantic States	2,674,670	2,607,100	67,580	97.5	2.5
New York	1,113,060	1,091,220	21,840	98.0	2.0
New Jersey	1,508,440	1,480,730	27,710	98.2	1.8
Delaware	53,170	35,150	18,020	66.1	33.9
Chesapeake Bay States	4,738,250	1,722,720	3,015,530	36.4	63.6
Maryland	2,282,960	207,780	2,075,180	9.1	90.9
Virginia	2,455,290	1,514,940	940,350	61.7	38.3
South Atlantic States	1,489,600	286,330	1,203,270	19.2	80.8
North Carolina	346,370	1,080	345,290	0.3	99.7
South Carolina	592,960	168,940	424,020	28.5	71.5
Georgia	66,900	57,130	9,760	85.4	14.6
Florida	483,370	59,180	424,190	12.2	87.8
Gulf States	3,686,770	868,770	2,818,000	23.6	76.4
Alabama	201,370	9,750	191,610	4.8	95.2
Mississippi	2,243,010	2,300	2,240,710	0.1	99.9
Louisiana	994,880	853,980	140,910	85.8	14.2
Texas	247,500	2,740	244,760	1.1	98.9

* In a few instances the totals are not equal to the figures shown. This difference is due to rounding out the figures when computing the averages. In no case, however, does the difference exceed 10 bushels.

Authority: Computed from various reports of the U. S. Bureau of Fisheries.

TABLE 8.

THE VALUE OF THE AVERAGE ANNUAL PRODUCTION OF MARKET OYSTERS IN THE ATLANTIC AND GULF STATES, CLASSIFIED ACCORDING TO PRIVATE AND PUBLIC BEDS, FOR THE PERIOD 1929 TO 1932, INCLUSIVE *

Areas and States	Total	Private Beds	Public Beds	Per cent Private Beds	Per cent Public Beds
Total Atlantic and Gulf States	$9,338,690	$6,370,610	$2,968,080	68.2	31.8
New England States	1,243,570	1,232,000	11,570	99.1	0.9
Massachusetts	146,010	145,390	630	99.6	0.4
Rhode Island	622,920	621,240	1,690	99.7	0.3
Connecticut	474,630	465,380	9,250	98.1	1.9
Middle Atlantic States	3,527,640	3,442,230	85,410	97.6	2.4
New York	1,564,650	1,529,230	35,430	97.7	2.3
New Jersey	1,921,050	1,885,270	35,770	98.1	1.9
Delaware	41,940	27,730	14,210	66.1	33.9
Chesapeake Bay Area	3,419,960	1,286,730	2,133,230	37.6	62.4
Maryland	1,734,900	188,630	1,546,270	10.9	89.1
Virginia	1,684,060	1,098,100	585,960	65.2	34.8
South Atlantic States	384,050	56,800	328,250	14.5	85.5
North Carolina	136,030	790	135,230	0.6	99.4
South Carolina	98,840	30,600	68,230	33.0	67.0
Georgia	13,870	11,200	2,680	80.7	19.3
Florida	141,320	13,210	128,110	9.3	90.7
Gulf States	764,460	356,840	410,620	46.3	53.7
Alabama	25,850	3,950	21,900	15.3	84.7
Mississippi	280,050	720	279,330	0.3	99.7
Louisiana	376,910	346,550	27,360	92.7	7.3
Texas	84,660	2,630	82,030	3.1	96.9

* In a few instances the totals are not equal to the figures shown. This difference is due to rounding out the figures when computing the averages. In no case, however, does the difference exceed $10.00.

Authority: Computed from various reports of the U. S. Bureau of Fisheries.

TABLE 9.

THE AVERAGE VALUE PER BUSHEL OF MARKET OYSTERS TAKEN FROM PRIVATE AND PUBLIC BEDS OF THE ATLANTIC AND GULF STATES, FOR THE PERIOD 1929 TO 1932, INCLUSIVE

Areas and States	Total	Private	Public
Total Atlantic and Gulf States	$0.69	$0.99	$0.42
New England States	1.32	1.32	1.49
Massachusetts	3.12	3.13	1.97
@ Rhode Island	1.44	1.44	2.14
@ Connecticut	1.03	1.04	1.39
Middle Atlantic States	1.32	1.32	1.26
@ New York	1.41	1.40	1.62
@ New Jersey	1.27	1.27	1.29
Delaware	0.79	0.79	0.79
Chesapeake Bay States	0.72	0.75	0.71
@ Maryland	0.76	0.91	0.75
@ Virginia	0.69	0.72	0.62
South Atlantic States	0.26	0.19	0.27
North Carolina	0.39	0.73	0.39
@ South Carolina	0.16	0.18	0.15
Georgia	0.21	0.20	0.27
@ Florida	0.29	0.22	0.30
Gulf States	0.20	0.41	0.14
Alabama	0.13	0.41	0.11
@ Mississippi	0.13	0.31	0.13
@ Louisiana	0.38	0.41	0.19
Texas	0.31	0.96	0.34

@ States producing an average of over 400,000 bushels of oysters per year during the period 1929-1932, inclusive.

Authority: Computed from the figures presented in tables 7 and 8

TABLE 10

The Quantity and Value of Oysters Fresh-Shucked in the Atlantic and Gulf States, Together with the Average Value per Gallon, for the Years 1930 and 1931 ¢ x

Areas and States	1931		1930 #		Average Value per Gallon	
	Gallons	Value	Gallons	Value	1931	1930
Total Atlantic and Gulf States	5,304,240	$7,950,395	5,419,677	$9,888,352	$1.50	$1.82
New England States	513,252	1,131,288	573,886	1,443,638	2.20	2.52
Massachusetts	2,185	6,323	2,279	6,305	2.89	2.77
Rhode Island	307,233	715,542	345,310	873,659	2.33	2.53
Connecticut	203,834	409,423	226,297	563,674	2.01	2.49
Middle Atlantic States	980,636	2,021,176	873,701	2,036,148	2.06	2.33
New York	295,550	697,287	252,192	661,816	2.36	2.62
New Jersey	448,724	795,169	439,824	952,651	1.77	2.17
Delaware	77,750	132,488	78,080	153,582	1.70	1.97
* Pennsylvania	158,612	396,232	103,605	268,097	2.50	2.59
Chesapeake Bay States	3,084,964	3,981,770	3,220,119	5,298,165	1.29	1.65
Maryland	1,858,114	2,181,131	1,835,283	2,958,141	1.17	1.61
Virginia	1,226,850	1,800,639	1,384,836	2,340,024	1.47	1.69
South Atlantic States	326,700	356,539	@	@	1.09	@
North Carolina	134,388	123,470	112,539	140,465	0.92	1.25
South Carolina	21,653	22,827	32,943	38,750	1.05	1.18
Georgia	29,115	31,545	@	@	1.08	@
Florida	141,544	178,697	140,874	211,875	1.26	1.50
Gulf States	398,688	459,622	465,615	719,311	1.15	1.54
Alabama	26,659	30,171	22,468	25,975	1.13	1.16
Mississippi	58,569	58,403	90,850	134,794	1.00	1.48
Louisiana	202,015	256,882	242,712	413,350	1.27	1.70
Texas	111,445	114,166	109,585	145,192	1.02	1.32

¢ Includes oysters shucked in regular establishments as well as by the fishermen themselves.
x Only years for which full data are readily available.
Quantity and value exclusive of Georgia.
* A large portion of the oysters shucked in this State were probably received from other areas.
@ Data for 1930 are not available for Georgia, consequently the totals for the South Atlantic States could not be computed.

Authority: Computed from various reports of the U. S. Bureau of Fisheries.

TABLE 11.

TREND IN THE VOLUME AND VALUE OF THE CRAB PRODUCTION IN MARYLAND, FOR VARIOUS YEARS FROM 1880 TO 1933, INCLUSIVE

YEAR	Total Production POUNDS	VALUE	YEAR	Total Production POUNDS	VALUE
1933	30,097,129	$ 570,148	1901	14,128,375	$ 288,447
1932	32,939,431	519,804	1897	9,449,195	217,568
1931	33,811,160	701,784	1891	7,605,770	303,716
1930	36,938,783	984,171	1890	6,444,209	260,413
1929	28,099,678	799,569	1888	4,883,504	198,769
1925	9,646,361	567,785	1887	4,394,168	170,757
1920	9,062,974	742,044	1880	1,166,667	46,850
1904	13,398,147	358,847			

Authority: Various reports of the U. S. Bureau of Fisheries.

INDEX